OBSERVATIONS ON THE VEGETATION OF THE MOSQUITIA IN HONDURAS

ANDRE F. CLEWELL

A. F. Clewell, Inc., 1345 University Parkway
Sarasota, Fl 34243

ABSTRACT

Species lists and vegetational descriptions are given for sedge savannahs (primarily), colluvial creek swamps, and pine-oak-nance woods of the Mosquitia region along the eastern Caribbean coast of Honduras. This vegetation is contrasted with that of adjacent tropical wet forests.

INTRODUCTION

La Mosquitia is a lowland extending for about 480 km along the Caribbean coast from Cape Cameron, Honduras, nearly to Bluefields, Nicaragua. Approximately three-fourths of this area is characterized by savannahs. Savannah vegetation consists of open grassy stands of *Pinus caribaea* Morelet on the better drained sites and by low sedge prairies on the wetter sites. The vegetation of these Miskito pine savannahs, as they are sometimes called, contrasts markedly with the broadleaved tropical wet forests of all other regions of the Caribbean coast of Central America, except Beliz, where savannahs also occur. The region is sparsely inhabited, mainly by Miskito Indians.

The purpose of this paper is to describe the vegetation of several plant communities, primarily the sedge savannahs, the colluvial creek swamps traversing these savannahs, and pine-oak-nance woods that are transitional between pine savannahs and tropical wet forest. The flora of the tropical wet forests is described briefly as it occurs at the inner edge of the Mosquitia and along an alluvial river within the Mosquitia.

PREVIOUS STUDIES

Carr (1950) briefly characterized this region, noting its foundation of marine Pleistocene deposits. Arnold (1954) described the geology, soils, and physiography of the Honduran Mosquitia and related his observations to recent changes in sea level. He gave few climatic data and noted the gross aspects of the vegetation. Parsons (1955) described the Mosquitia of both Honduras and Nicaragua with emphasis on the history and potential of land use. He included a map of the entire region and gave information on

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climate, soils, fire, and vegetation. Radley (1960) described the climate, soils, geology, and physiography of Mosquita of Nicaragua. Holdridge (1962) mapped the Mosquitia as a wet tropical forest region. Taylor (1963) briefly described the pine savannahs in his survey of the vegetation of Nicaragua. Wagner (1964) compared the Mosquitia to the savannahs of Beliz and Yucatan. Munro (1966) discussed the vegetation of the Mosquitia of Nicaragua in relation to fire. The United Nations Development Program (UNDP, 1968) mapped and characterized the pine resources in the Honduran Mosquitia.

Systematic plant collecting began in the Honduran Mosquitia with several expeditions, including those reported herein, by personnel from the National University between 1970 and 1976. Nelson (1976, 1978) published check lists of most species collected on these expeditons. Proctor (1983) mentioned his having made subsequent collections in 1981 and described two species.

REGIONAL DESCRIPTION

The Mosquitia of Honduras is shown in Figure 1. The entire region is within the Department of Gracias a Dios, and the principal town is Puerto Lempira. The 100 meter contour, shown by the dotted line, is approximately the interior boundary of the Mosquitia. The actual boundary is at a slightly lower elevation, where steep mountains clothed with tropical wet forests abruptly meet the flat coastal plain. The savannahs of the Mosquitia occupy flat or gently rolling terrain. Several rivers, notably the Río Patuca and the Río Plátano, extend from the mountains through the savannahs. Fertile alluvium flanks each of these rivers and supports a corridor of tropical wet forest that extends from the mountains to the coast. These forests, with canopies $30-40$ m tall, stand in sharp contrast and often without ecotone to the low, grassy savannahs.

Annual rainfall varies from about 200 to 400 cm. Parsons (1955) said that the region, "is probably the rainiest area of its size in the New World with a savanna-type vegetation." A $2-3$ month dry season from March to May is mild in some areas but severe in others, sometimes with less than 3 cm of rain a month. Munro (1966) said that high temperatures (mean annual >24C) and low spring rainfall stressed the vegetation.

Upper soil horizons are highly leached and infertile, gravelly quartz sands and sandy loams lacking in organic matter. Subsoils are poorly drained, inhibiting root growth and thereby limiting that volume of soil from which nutrients can be exploited and in which anchorage can be attained. Pines lack tap roots and often topple in hurricanes (Munro 1966).

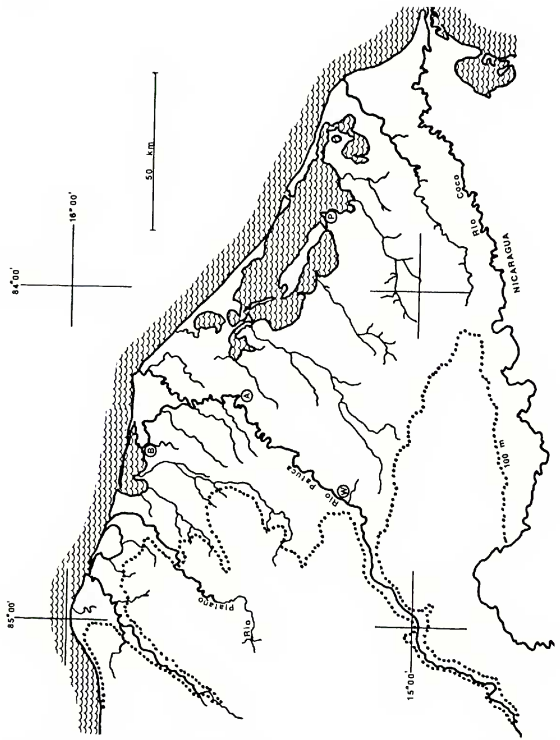

Fig. 1. Mosquitia region of Honduras, showing collecting locations. A - Ahuas, B - Brus Laguna, P - Puerto Lempira, W - Wampusirpe.

Percolation is rapid in dry seasons, causing stress to the shallowly rooted vegetation.

Fires burn the savannahs frequently, often annually. The UNDP (1968) reported that 28% of the pine stands in the Mosquitia had been burned within the year of inventory. Fires are ignited at any season but particularly the dry season. At least some fires are set intentionally to provide fresh grass for livestock, to rid ticks and snakes, to facilitate hunting, or simply to provide entertainment (Arnold 1954, Munro 1966). Flames reach to the edges of the tropical wet forests but do not enter them for lack of graminaceous vegetation or other flammable materials. Frequent fires and infertile soils combine to prevent plants of tropical wet forests from colonizing the savannahs.

The predominant vegetation towards the coast is sedge prairie, dominated by species of *Rhynchospora*. Pinelands occur primarily in the interior of the Mosquitia, where soils are better drained and finer textured. The UNDP (1968) estimated that 76% of the Mosquitia was pineland but that much of this area had been logged. This report said that tree density was low but tree size was large, with 24% of the trees being over 50 cm in diameter. Most trees were reported as having defects, which were thought to have resulted from storms.

Thickets of shrubs and small trees occassionally interrupt the savannahs. These are usually dominated by palms *(Paurotis wrightii)* or by coppicing hardwoods *(Davilla kunthii, Quercus oleoides)*. Nearer the alluvial rivers, thickets occur that are dominated by species of such genera as *Miconia, Isertia, Psychotria,* and *Helicteres*. Parsons (1955, citing R. L. Pendleton) said that these hardwood islands may have developed on former camp sites of Miskito Indians, where there had been protection from fire and where the soil had been enriched by refuse and ashes.

The Mosquitia contains many small creeks with headwaters within the flat coastal plain; some are shown in Figure 1. These minor drainages show little topographic relief and do not have enough flow for much alluvial transport of sediments. They are flanked by narrow ribbons of creek swamp, consisting of short, broadleaved trees. These creek swamps are floristically depauperate, compared to the much taller tropical wet forests along the large, alluvial rivers.

Near the base of the mountains, the pine savannahs contain a greater mixture of woody species than elsewhere. Although *Pinus caribaea* is generally the sole occupant of the overstory, the understory is distinctive for its open growth of broadleaved trees and shrubs. The most conspicuous understory species are an oak *(Quercus oleoides)* and nance *(Byrsonima crassifolia)*. This pine-oak-nance woods appears to suffer less fire than the open

pinelands. Munro (1966) described similar vegetation in Nicaragua and said that it had a fire frequency of about every five years.

Vegetation at the coast is distinct from that of the savannahs and consists of beach strand vegetation, mangrove forests, tidal marshes, and scrubby woodlands, similar to that described by Sauer (1967). Ruderal and other obviously disturbed vegetation is restricted to the vicinity of the very few towns and settlements.

METHODS

Observations in this paper were made during three collecting trips totaling 15 days in 1972–73. The first trip was made on December 12–14, 1972, near Ahuas (Figure 1) in sedge prairies and creek swamps. The second trip was made May 17–23, 1973, with Gustavo Cruz and A. H. Gentry in the vicinity of the Río Plátano. Collecting locations included sedge prairies, alluvial river swamps, tropical wet forests near the river 10 and 18 km inland, and tropical wet forests in low mountains 25 km inland. The third trip was taken August 30-September 3, 1973, to Ahuas, Brus Laguna, and Wampusirpe. Collecting locations included sedge prairies, colluvial creek swamps, pine savannahs, pine-oak-nance woods, and tropical wet forests, the latter near Wampusirpe at the foot of mountains bordering the savannah region.

Sedge savannahs were collected intensively on all three trips, allowing a rather thorough, systematic inventory of the flora. Creek swamps and pine-oak-nance woods were collected less intensively. Although tropical wet forests were visited on two trips, only a fraction of this rich vegetation could be collected.

The Mosquitia was reached by twice weekly scheduled flights from Tegucigalpa, weather permitting. Accomodations, electricity, and most logistical ammenities were scarce. Transportation within the region was made difficult from the lack of roads and vehicles. River transportation was by piragua, including one called a tuk-tuk. This craft was a 40 foot long mahogany dugout and was named for the sound of its one-cylinder inboard engine. Several landing strips for light aircraft were scattered throughout the region. Rides were available from the Missionary Aviation Fellowship *(Alas de Socorro)* which served the Mosquitia.

The most complete sets of specimens were deposited at the National University (TEFH) and at the Escuela Agricola Panamericana (EAP). A partial set containing specimens primarily from the savannahs was deposited at Florida State University (FSU). Another nearly complete set and all remaining duplicates were given to the Missouri Botanical Garden (MO) in exchange for a travel grant for one of the field trips. Plant names

follow Standley et al. (1958-1975) and Molina (1975) for most groups, Ames and Correll (1953) for orchids, and Clewell (1975) for composites.

RESULTS

Table 1 lists the flora of the grass-sedge savannahs. Table 2 lists the vascular flora of creek swamps along the colluvial streams with headwaters within the Mosquitia. Table 3 lists characteristic plants of the pine-oak-nance woods. Table 4 lists characteristic trees of tropical wet forests.

DISCUSSION

SEDGE SAVANNAHS. One hundred sixty-five species were recorded in the sedge savannahs (Table 1). The most abundant species was *Rhynchospora globosa,* and perhaps the next most abundant was *Paspalum pulchellum.* Other abundant species were *Rhynchospora chapmanii* and *R. barbata.* Particularly wet areas lacked grasses, but plants of *Tonina fluviatilis* and *Utricularia subulata* grew abundantly between the cespitose tussocks of *Rhynchospora globosa.* The relatively dry sedge savannahs contained much *Bulbostylis paradoxa* and *Declieuxia fruticosa.* Most herbaceous vegetation was 1 – 3 dm tall. Thickets of *Paurotis wrightii* were common in wet areas, and shrubs of *Davilla kunthii* and *Quercus oleoides* preferred higher ground.

Pine savannahs neighboring the sedge savannahs were characterized by much *Pteridium aquilinum, Rhynchospora rugosa,* and *Setaria geniculata.* Species denoted with an asterisk in Table 1 were those that occurred largely or entirely in disturbed horse pastures within the savannahs. These species may not be characteristic of the savannah flora but rather of ruderal habitats.

Parsons (1955) noted how, "the open, park-like Miskito savanna bears an extraordinary resemblance to the pine flats of Louisiana or Florida." Wagner (1964) reiterated Parson's observation. Twenty-two species (13.3%) listed in Table 1 are indigenous to northwestern Florida (Clewell 1985). Notable floristic dissimilarities between the two regions include the prominance of the Compositae and the unimportance of the Melastomataceae and Rubiaceae along the northern Gulf coast, as compared to the Mosquitia.

CREEK SWAMPS. The canopy of the creek swamp was dense, generally less than 10 m tall, and consisted mainly of broadleaved, evergreen species. Table 2 lists 52 species for the creek swamps. The Guttiferae provided the most important elements of the overstory, and *Symphonia globulifera* may have been the most abundant tree. Most species were trees and shrubs; most of the rest were epiphytes and woody vines. Terrestrial herbs were

TABLE 1. Plants of Sedge Savannahs and Their Life Forms.

T - tree, S - shrub, V - woody vine, H - terrestrial herb, E - epiphytic herb, P - parasite. An asterisk (*) denotes species occurring largely or entirely in savannahs used as pasture.

POLYPODIACEAE

Blechnum indicum Burm.—H
Cochlidium rostratum (Hook.) Maxon—E
Pteridium aquilinum (L.) Kuhn.—H

CYATHEACEAE

Alsophila microdonta Desv.—S
Trichopteris microdonta (Desv.) Tryon—S

LYCOPODIACEAE

Lycopodium carolinianum L.—H
Lycopodium cernuum L.—H

PINACEAE

Pinus caribaea Morelet—T

GRAMINEAE

Andropogon bicornis L.—H
Andropogon leucostachyus HBK.—H
Andropogon virgatus Desv.—H
Eragrostis acutiflora (HBK.) Nees—H
Eragrostis elliottii S. Wats.—H
Eragrostis maypurensis (HBK.) Steud.—H
Homolepis aturensis (HBK.) Chase—H
Isachne polygonoides (Lam.) Doell.—H
Leptocoryphium lanatum (HBK.) Nees—H
Mesosetum blakei Swallen—H
Panicum blakei Swallen—H
Panicum cyanescens Nees ex Trin.—H
Panicum hians Ell.—H
Panicum pilosum Sw.—H
Panicum polygonatum Schrad.—H
Paspalum clavuliforum C. Wright—H
Paspalum minus Fourn.—H
Paspalum plicatulum Michx.—H
Paspalum pulchellum Kunth—H
Sacciolepis myuros (Lam.) Chase—H
Setaria geniculata (Lam.) Beauv.—H
Thrasya paspaloides HBK.—H
Trachypogon angustifolius (HBK.) Nees ex Hack.—H
Tripsacum sp.—H

CYPERACEAE

Bulbostylis paradoxa (Spreng.) Lindman—H
Cyperus diffusus Vahl—H
Cyperus flavus (Vahl) Nees—H
Cyperus haspan L.—H
Cyperus odoratus L.*—H
Eleocharis filiculmis Kunth—
Eleocharis retroflexa (Poir.) Urban—H
Fimbristylis autumnalis (L.) R. & S.—H
Rhynchospora barbata (Vahl) Kunth—H
Rhynchospora cephalotes (L.) Vahl—H
Rhynchospora chapmanii Curtis—H
Rhynchospora cyperoides (Sw.) Mart.—H
Rhynchospora divergens Curtis—H
Rhynchospora globosa (HBK.) R. & S.—H
Rhynchospora hirsuta Vahl—H
Rhynchospora marisculus Nees—H
Rhynchospora rugosa (Vahl) Gale—H
Rhynchospora setacea (Berg) Boeckel—H
Sideria cyperina Kunth—H

PALMAE

Paurotis wrightii (Griseb. & Wendl.) Britt.—S

ARACEAE

Anthurium turrialbense Engler—H

XYRIDACEAE

Xyris ambigua Beyr. ex Kunth—H

ERIOCAULACEAE

Tonina fluviatilis Aubl.—H

COMMELINACEAE

Aneilema geniculata (Jacq.) Woodson*—H

HYPOXIDACEAE

Curculigo scorzoneraefolia (Lam.) Baker—H

IRIDACEAE

Cipura paludosa Aubl.—H
Nemastylis tenuis (Herb.) Baker—H

BURMANNIACEAE

Burmannia capitata (Walt.) Mart.—H

ORCHIDACEAE

Habenaria pauciflora (Lindl.) Reichb. f.—H
Laelia tibicinis (Batem. ex Lindl.) L. Wms.—E
Scaphyglottis cuneata Schltr.—E
Schomburgkia tibicinis Batem.—E
Spiranthes sp.—H

MYRICACEAE

Myrica cerifera L.—S

FAGACEAE

Quercus oleoides S. & C.—T

AMARANTHACEAE

Alternanthera sessilis (L.) R. Br.—H

CAPPARACEAE

Cleome serrata Jacq.*—H

DROSERACEAE

Drosera capillaris Poir.—H

CHRYSOBALANACEAE

Chrysobalanus icaco L.—S
Hirtella racemosa Lam.—S

TABLE 1 (continued)

LEGUMINOSAE
Aeschynomene histrix Poir.—H
Cassia diphylla L.—H
Cassia flexuosa L.—H
Cassia tagera L.—H
Clitoria rubiginosa Juss.—V
Crotalaria purshii DC.—H
Desmanthus virgatus (L.) Willd.—H
Desmodium barbatum (L.) Benth. & Oerst.—H
Eriosema diffusum (HBK.) G. Don—H
Eriosema pinetorum Standl.—H
Eriosema violaceum (Aubl.) G. Don—S
Galactia sp.—H
Mimosa pudica L.—H
Phaseolus linearis HBK.—H
Stylosanthes guyanensis (Aubl.) Sw.—H
Tephrosia nitens Benth.—H
Zornia reticulata Sw.—H
MALPIGHIACEAE
Byrsonima crassifolia (L.) HBK.—T
POLYGALACEAE
Polygala adenophora DC.—H
Polygala hygrophyla HBK.—H
Polygala salviniana Bennett—H
Polygala timoutou Aubl.—H
EUPHORBIACEAE
Acalypha arvensis P. & E.*—H
Caperonia palustris (L.) St. Hil.—H
Croton trinitatis Millsp.*—H
Euphorbia anychioides Boiss.—H
Euphorbia hyssopifolia L.—H
Phyllanthus niruri L.—H
MALVACEAE
Abutilon hemsleyanum Rose—H
Urena lobata L.*—H
STERCULIACEAE
Melochia villosa (Mill.) Fawc. & Rendl.—S
DILLENIACEAE
Davilla kunthii St. Hil.—S
OCHNACEAE
Sauvagesia erecta L.—H
TURNERACEAE
Piriqueta cistoides (L.) Mey. ex Steud.—H
Turnera sp.—H
PASSIFLORACEAE
Passiflora foetida L.—H
MYRTACEAE
Psidium guianeense Sw.—S
Psidium salutare (HBK.) Breg.—S
MELASTOMATACEAE
Aciotis rostellata (Naud.) Triana*—H
Acisanthera bivalvis (Aubl.) Cogn.—H
Acisanthera quadrata Pers.—H
Clidemia capitellata (Bonpl.) D. Don—S
Clidemia densiflora (Standl.) Gl.—S
Miconia albicans (Sw.) Triana—S
Miconia ciliata (L. Rich.) DC.—S
Miconia hondurensis D. Sm.—S
Miconia lundelliana L. Wms.—S
Miconia prasina (Sw.) DC.—T
Miconia schippii Standl.—S
Nepsera aquatica (Aubl.) Naud.—S
Pterolepis stenophylla Gl.—H
Rhynchanthera paludicola (D. Sm.) Gl.—H
Tibouchina aspera Aubl.—S
ONAGRACEAE
Jussiaea nervosa Poir.—S
GENTIANACEAE
Centaurium pringleanum (Wittr.) Rob.—H
Schultesia brachyptera Cham.—H
APOCYNACEAE
Tabernaemontana chrysocarpa Blake—S
CONVOLVULACEAE
Cuscuta sp.—HP
VERBENACEAE
Citharexylum caudatum L.—S
Stachytarpheta angustifolia (Mill.) Vahl—H
Tamonea spicata Aubl.—H
LABIATAE
Hyptis atrorubens Poit.—H
Hyptis capitata Jacq.*—H
Hyptis conferata Pohl. ex Benth.—H
Ocimum micranthum Willd.*—H
SCROPHULARIACEAE
Angelonia ciliaris Rob.—H
Buchnera pusilla HBK.—H
Gerardia albida (B. & R.) Standl.—H
Gerardia hispidula Mart.—H
Gerardia spuciflora Engelm.—H
LENTIBULARIACEAE
Utricularia hispida Lam.—H
Utricularia subulata L.—H
RUBIACEAE
Alibertia edulis (L. Rich.) A. Rich. ex DC.—H
Anisomeris protracta (Bartl.) Standl.—S
Borreria laevis (Lam.) Griseb.—H
Borreria ocymoides (Burm.) DC.—H
Borreria suaveolens Mey.—H
Coccocypselum hirsutum Bartl.—H
Declieuxia fruticosa (Willd.) Kuntze—S
Diodia sarmentosa Sw.*—H
Isertia haenkeana DC.—S

TABLE 1 (continued)

Palicourea galeottiana Mart.—S	*Spilanthes americana* (Mutis) Hieron.—H
Palicourea triphylla DC.—SV	*Spilanthes merrillii* Standl. & Wms.—H
Psychotria capitata R. & P.—S	*Spilanthes poliolepidica* Moore—H
Psychotria officinalis (Aubl.) Sandw.—S	*Vernonia cinerea* (L.) Less.—H
COMPOSITAE	*Wedelia trilobata* (L.) Hitchc.—H
Erechtites hieracifolia (L.) Raf.*—H	*Zexmenia pinetorum* Standl. & Steyerm.—S
Orthopappus angustifolius (Sw.) Gl.—H	

represented mainly by a few ferns and dense patches of the clambering *Scleria secans*.

Many shrubs of the sedge savannahs (Table 1) were increasingly common with proximity to creek swamps. Some of these shrubs rightfully could be included as components of both commmunities, although they were restricted to the sunny edges of creek swamps. *Calliandra houstoniana* commonly flanked creek swamps.

In physiognomy, these swamps resembled creek swamps along the northern Gulf coast that are dominated by species of *Cliftonia, Cyrilla, Ilex, Lyonia,* and *Magnolia*. These Gulf coastal swamps share little in common floristically with Honduran creek swamps.

PINE-OAK-NANCE WOODS. As noted above, this ecotonal community is named for its three most conspicuous woody species, *Pinus caribaea, Quercus oleoides,* and *Byrsonima crassifolia* (nance). The pines comprised an open overstory 20 – 25 m tall. One pine stump 56 cm in diameter contained more than 100 annual rings. Oaks were upwards to 12 m tall and typically formed an open understory along with small trees and large shrubs of other species. Nance was the most common of these other species and grew to a height of 5 meters. *Calliandra houstoniana* was common, and a tree fern, *Alsophila myosuroides,* was conspicuous. Grasses and forbs generally comprised a continuous ground cover. This ground cover became sparse or absent in the occasional dense thickets of understory trees.

Table 3 lists 28 species characteristic of the community. Many other species belong to this community that also occur in the pine savannahs. Unfortunately, the site that was examined had been recently burned, making a thorough inventory impossible. The most common herb was *Paspalum pectinatum*. Grasses, rather than sedges, predominated in the ground cover. Notable by its absence was *Rhynchospora globosa,* the most abundant species of the sedge savannahs. The soil was loamy and probably more fertile than in the savannahs. The community resembled the pine-oak-hickory woods of the Tertiary highlands near the northern Gulf coast, both in physiognomy and with respect to soil type and fire frequency.

TABLE 2. Plants of the Creek Swamps and Their Life Forms

T - tree, S - shrub, V - woody vine, H - terrestrial herb, E - epiphytic herb, P - parasite.

POLYPODIACEAE
Lindsaea stricta (Sw.) Dryand.—H
Nephrolepis biserrata (Sw.) Schott—E
Polypodium palmeri Maxon—H
Polypodium polypodioides (L.) Watt.—E
Polypodium triseriale Sw.—E
Vittaria lineata (L.) J. Smith—E
CYPERACEAE
Scleria secans (L.) Urban—H
ARACEAE
Syngonium podophyllum Schott—H
BROMELIACEAE
Aechmea bracteata (Sw.) Griseb.—E
Bromelia pinguin L.—E
Tillandsia balbisiana Schult.—E
Tillandsia bulbosa Hook.—E
PIPERACEAE
Piper aduncum L.—T
LORANTHACEAE
Phoradendron quadrangulare (HBK.) Krug. & Urban—PS
Struthanthus orbicularis (HBK.) Blume—PV
ANNONACEAE
Xylopia aromatica (Lam.) Mart.—T
LEGUMINOSAE
Calliandra houstoniana (Mill.) Standl.—S
Cassia bacillaris L.f.—V
Pithecellobium donnell-smithii (B. & R.) Standl.—T
MALPIGHIACEAE
Byrsonima crassifolia (L.) HBK.—T
EUPHORBIACEAE
Pera arborea Mutis—T
AQUIFOLIACEAE
Ilex guianensis (Aubl.) Kunrze—T
VITACEAE
Cissus erosa L. Rich.—V
Cissus salutaris HBK.—V
MALVACEAE
Hibiscus furcellatus Lam.—S
STERCULIACEAE
Helicteres guazumaefolia HBK.—S
DILLENIACEAE
Curatella americana L.—T
GUTTIFERAE
Clusia flava Jacq.—T
Clusia salviniі D. Sm.—T
Symphonia globulifera L.f.—T
Vismia camparaguey Sprague & Riley—TV
COCHLOSPERMACEAE
Cochlospermum vitifolium Willd. ex Spreng.—T
MYRTACEAE
Eugenia aerugnea DC.—T
MELASTOMATACEAE
Clidemia strigillosa (Sw.) DC.—S
Conostegia tomandra (Sw.) DC.—S
Henriettea succosa (Aubl.) DC.—T
Miconia borealis Gl.—T
Miconia ibaguensis (Bonpl.) Triana—T
Miconia schlechtendalii Cogn.—S
Tococa guianensis Aubl.—S
ONAGRACEAE
Jussiaea linifolia Vahl—H
SAPOTACEAE
Chrysophyllum cainito L.—T
APOCYNACEAE
Mandevilla subsagittata (R. & P.) Woodson—V
CONVOLVULACEAE
Cuscuta sp.—HP
VERBENACEAE
Citharexylum caudatum L.—T
Lantana camara L.—S
SOLANACEAE
Solanum jamaicense Mill.—S
RUBIACEAE
Alibertia edulis (L. Rich.) A. Rich.—S
Amaioua corymbosa HBK.—T
Cephaelis tomentosa (Aubl.) Vahl—S
Chiococca pachyphylla Wernham—V
Guettarda combsii Urban—T

TROPICAL WET FOREST. As mentioned earlier, the flora of the tropical wet forests contrasted markedly with that of the savannahs, including the creek swamps and the pine-oak-nance woods. Since a systematic inventory of tropical wet forest was not possible, only a few trees have been

TABLE 3. Plants Characteristic of the Pine-Oak-Nance Woods and Their Life Forms.

T - tree, S - shrub, V - woody vine, H - terrestrial herb, E - epiphytic herb, P - parasite.

POLYPODIACEAE
Polypodium lycopodioides L.—H
Polypodium triseriale Sw.—H
Vittaria lineata (L.) J. Smith —E
CYATHEACEAE
Alsophila myosuroides Liebm.—S
PINACEAE
Pinus caribaea Morelet—T
GRAMINEAE
Axonopus purpusii (Mez) Chase—H
ARACEAE
Anthurium scandens (Aubl.) Engler—H
ORCHIDACEAE
Epidendrum nocturnum Jacq.—E
FAGACEAE
Quercus oleoides S. & C.—T
LEGUMINOSAE
Calliandra houstoniana (Mill.) Standl.—S
Cassia bacillaris L.f.—V
MALPIGHIACEAE
Byrsonima crassifolia (L.) HBK.—T
AQUIFOLIACEAE
Ilex guianensis (Aubl.) Kuntze—T
GUTTIFERAE
Vismia camparaguey Sprague & Riley—TV
MELASTOMATACEAE
Bellucia costaricensis Cogn.—T
Clidemia capitellata (Bonpl.) D. Don—S
Henriettea fasciculatis (Sw.) Gomez—T
Miconia borealis Gleason—T
Miconia chaguensis (Bonpl.) Triana—T
Miconia lacera (Bonpl.) Naud.—S
Miconia prasina (Sw.) DC.—T
ARALIACEAE
Didymopanax morototoni (Aubl.) Dcne. & Planch.—T
CLETHRACEAE
Clethra macrophylla Mart. & Gal.—T
RUBIACEAE
Alibertia edulis (L. Rich.) A. Rich.—S
Palicourea triphylla DC.—V
Psychotria cuspidata Bredem. ex R. & S.—S
Sabicea panamensis Wernham—V
COMPOSITAE
Zexmenia pinetorum Standl. & Steyerm.—S

TABLE 4. Trees Characteristic of the Tropical Wet Forest.

SWAMP FOREST, NEAR MOUTH OF RÍO PLÁTANO	RIVERINE FOREST 10-25 KM FROM MOUTH OF RÍO PLÁTANO
Montrichardia arborescens (L.) Schott	*Pourouma aspera* Trecul.
Cocoloba barbadensis Jacq.	*Vochysia hondurensis* Sprague
Annona glabra L.	*Cupania auriculata* Standl.
Inga spuria H. & B. ex Willd.	*Apeiba membranacea* Spruce ex Benth.
Pithecellobium latifolium (L.) Benth.	*Protium glabrum* (Rose) Engler
Carapa guianensis Aubl.	*Annona murjcata* L.
Pachira aquatica Aubl.	*Sloanea zuliaensis* Pitt.
Symphonia globulifera L.f.	*Bixa orellana* L.
Pleuranthodendron mexicana (Gray) L. Wms.	*Aspidosperma megalocarpon* Muell.-Arg.
Grias integrifolia (Standl.) Kunth	*Miconia hondurensis* D. Sm.
Tournefortia bicolor Sw.	
Faramea stenura Standl.	
Hamelia rovirosae Wernham	
Palicourea fastigata Benth.	

listed to introduce the tropical wet forest and to indicate the considerable floristic differences with savannas. Table 4 lists trees collected in a swamp near the mouth of the Río Plátano and in the floodplain and associated slopes of this river at collecting stations 10, 18, and 25 km inland from the coast. *Symphonia globulifera* was the only species common to the tropical wet forest and savannah flora listed in Tables 1-3.

The same degree of floristic contrast is evident along the northern Gulf coast, where hardwood forests of floodplains and ravines differ substantially from adjacent pinelands and savannahs (Clewell 1977, Clewell et al. 1982).

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